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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,711	04/13/2001	Luc Ouellet	10932-US	4962

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EXAMINER	
TUROCY, DAVID P	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/833,711	OUELLET ET AL.	
	Examiner	Art Unit	
	David Turocy	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,6,8,14-18 and 21-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,6,8,14-18 and 21-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's argument with respect to the 35 USC 112 1st paragraph rejection of the claims has been deemed persuasive and therefore the rejection has been withdrawn. Upon further consideration the examiner has withdrawn the finality of the last office action, setting forth new grounds of rejection that follow.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 3, 8, 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ojha et al. (USPN 5,904,491) in view of Ngo et al. (USPN 6,127,261) and further in view of Hsieh et al. ("Characteristics of low-temperature and low-energy plasma-enhanced chemical vapor deposited SiO_2", 1993).

Ojha et al. teaches a method of depositing an optical quality silica film on a substrate of a silica waveguide in manufacturing of a optical demultiplexer (Col.1, lines 3 – 8, Col.2, lines 43 – 58, Col. 5, lines 2019-20, and Col.6, lines 5 – 15), the method comprising forming an optical quality (i.e., silica) film on a substrate by PECVD in the presence of gases (Col.1, lines 64 – 67, Col.2, lines 1 – 10 and 43 – 57, Col.3, lines 10 – 11, 20 – 24, and 32 – 44, and Col.4, lines 22 – 29), and subjecting the as-deposited film to a low temperature treatment between 400° C to 1200° C, specifically at 800° C, to minimize the presence of contaminant compounds in the film (Col.1, lines 12 – 53 and 64 – 67, Col.2, lines 1 – 10 and 58 – 65, Col.3, lines 52 – 62, and Col.5, lines 20 – 36). While Ojha exemplified BPSG silica films, Ojha clearly discloses the cladding layer can be free of boron or phosphorus by alternatively doping with germania, titania, or arsenic (Column 3, lines 36-40).

Ojha et al. does not teach the specifics of the PECVD process, such as (1) a silane flow rate of 0.2 SLM, an N_2O flow rate of 6.0 SLM, and a N_2 flow rate of 3.15 SLM, (2) a total deposition pressure of about 2.4 Torr, and (3) a deposition temperature of between 100 and 650° C, particularly 400° C. In general, Ojha et al. is silent as to the specifics of the PECVD process, except to say that the PECVD process may involve the use of silane and nitrous oxide as sources for silicon and oxygen, respectively, for the

deposition of the waveguide material (Col.3, lines 19 – 24). Therefore, one of ordinary skill in the art would have been motivated to seek-out and utilize PECVD process parameters that are effective in depositing a silica film from gases such as silane and nitrous oxide, as desired by Ojha et al.

Ngo et al. teaches that the PECVD process recipe claimed by the applicant (i.e., a silane flow rate of 0.2 SLM, an N_2O flow rate of 6.0 SLM, a N_2 flow rate of 3.15 SLM, a total deposition pressure of about 2.4 Torr, and a deposition temperature of between 100 and 650° C, particularly 400° C) is a well-known PECVD process recipe used to deposit silica films on a substrate (Col.4, lines 13 – 31, Claims 1 – 4). It would have been obvious to one of ordinary skill in the art to utilize the PECVD process parameters taught by Ngo et al. to deposit the silica film(s) of Ojha et al. because Ojha et al. generally desires to deposit a silica film by PECVD from silane and nitrous oxide reactants and Ngo et al. teaches a specific set of process parameters (e.g., gas flow rates, deposition pressure, deposition temperature, etc.) that are used to achieve just such a goal.

The combination of Ojha et al. and Ngo et al. does not explicitly teach that the annealing process minimizes the presence of Si-O-H-N compounds in the film. However, Ojha et al. teaches that the annealing process removes undesirable contaminants from the film in general (Col.1, lines 12 – 53 and 64 – 67, Col.2, lines 1 – 10 and 58 – 65, Col.3, lines 52 – 62, and Col.5, lines 20 – 36), and the combination of Ojha et al. and Ngo et al. teaches each and every process step and limitation of the applicant's claims, including the PECVD deposition temperature, the types of process

gases, the deposition pressure, and the annealing temperature. As such, the annealing process of Ojha et al. would have inherently minimized the presence of Si-O-H-N compounds in the film, as claimed by the applicant. Please note that the mere observation of still another beneficial result (i.e., that annealing a PECVD silica film specifically reduces Si-O-H-N contaminants in the film, as opposed to contaminants in general) of an old process cannot form the basis of patentability (*Allen et al. v Coe*, 57 USPQ 136).

The combination of Ojha et al. and Ngo et al. does not explicitly teach the optimization process as claimed, however, Hsieh et al. teaches that, in the art of depositing silica films by PECVD from silane and N_2O reactants (i.e., a process analogous to that of Ojha et al. and Ngo et al.), the more important variables that affect the electrical and physical properties of the deposited films include total flow rate of the reactants and chamber pressure (page 2639, col.2). Therefore Hsieh discloses the chamber pressure is a known result effective variable. The chamber pressure during deposition has a direct correlation on the physical properties of the deposited silica film by PECVD. Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the deposition pressure used in the process of Ojha et al. and Ngo et al. in view of Hsieh through routine experimentation, to impart the deposited film with the desired physical properties. Ojha et al. in view of Ngo et al. and Hsieh does not explicitly teach that the total deposition pressure is controlled to minimize the presence of Si-O-H-N compounds as evidenced by the FTIR characteristics. However, the total pressure taught by Ojha et al. in view of

Ngo et al. (e.g., 2.0 to 2.4 Torr – see Ngo) is in the preferred range of pressures disclosed and claimed by the applicant (see, for example, applicant's Claim 1). Therefore, since the total pressure taught by Ojha et al. in view of Ngo et al. and Hsieh is in the range of pressures claimed by the applicant, the total pressure in Ojha et al. in view of Ngo et al. and Hsieh is inherently controlled "to minimize the presence of Si-O-H-N compounds". Please note that the mere observation of still another beneficial result (i.e., that a certain range of PECVD silica deposition pressures provides reduced contamination of the silica film) of an old process cannot form the basis of patentability (*Allen et al. v Coe*, 57 USPQ 136). Hsieh et al. also teaches using FTIR to analyze the composition and chemical bonds present in the deposited silica films, including any Si-H, Si-N, Si-O-H, N-H, etc. (page 2638, col.2; page 2639, col.1; page 640, column 1; page 2642, col.2). Therefore, it would have been obvious to one of ordinary skill in the art to analyze the silica films deposited by Ojha et al. and Ngo et al. with FTIR in order to reap the benefits of doing so, such as determining the composition and chemical bonds present in the films.

Ngo et al. also teaches a deposition temperature of about 400° C (**Claim 8**) (Column 4, lines 13-31); the applicant's claimed gases (i.e., SiH_4, N_2O, and N_2) and optimized flow rates (**Claims 14 – 18**) (Column 4, lines 13-31);

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ojha et al. (USPN 5,904,491) in view of Ngo et al. (USPN 6,127,261) and further in view of

Hsieh et al. ("Characteristics of low-temperature and low-energy plasma-enhanced chemical vapor deposited SiO_2", 1993) in further view of Chandross et al.

The combination of Ojha et al., Ngo et al., and Hsieh teaches all the limitations of **Claim 6** as set forth above, except for a method wherein the pressure is maintained by a vacuum pump having a controllable pumping speed, and the total gas pressure is maintained by controlling the pumping speed.

Specifically, the combination Ojha et al., Ngo et al., and Hsieh is silent as to how the appropriate chamber pressure is maintained. Chandross et al. teaches that it was known in the art of silicon oxide deposition at the time of the applicant's invention to maintain the desired pressure in a vacuum chamber by controlling the pumping speed of a vacuum pump (Col.5, lines 48 – 60). Therefore, it would have been obvious to one of ordinary skill in the art to maintain the desired pressure in the vacuum chamber during the PECVD process by controlling the pumping speed of a vacuum pump, as taught by Chandross et al., with the reasonable expectation of successfully and advantageously maintaining the desired pressure (e.g., 2.4 Torr) by utilizing a well-known, conventional means of doing so.

6. Claims 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ojha et al. (USPN 5,904,491) in view of Ngo et al. (USPN 6,127,261).

Regarding **Claims 21 and 23** Ojha et al. teaches a method of depositing an optical quality silica film on a substrate of a silica waveguide in manufacturing of a optical demultiplexer (Col.1, lines 3 – 8, Col.2, lines 43 – 58, Col. 5, lines 2019-20, and

Col.6, lines 5 – 15), the method comprising forming an optical quality (i.e., silica) film on a substrate by PECVD in the presence of gases (Col.1, lines 64 – 67, Col.2, lines 1 – 10 and 43 – 57, Col.3, lines 10 – 11, 20 – 24, and 32 – 44, and Col.4, lines 22 – 29), and subjecting the as-deposited film to a low temperature treatment between 400° C to 1200° C, specifically at 800° C, to minimize the presence of contaminant compounds in the film (Col.1, lines 12 – 53 and 64 – 67, Col.2, lines 1 – 10 and 58 – 65, Col.3, lines 52 – 62, and Col.5, lines 20 – 36). While Ojha exemplified BPSG silica films, Ojha clearly discloses the cladding layer can be free of boron or phosphorus by alternatively doping with germania, titania, or arsenic (Column 3, lines 36-40).

Ojha et al. does not teach the specifics of the PECVD process, such as (1) a silane flow rate of 0.2 SLM, an N_2O flow rate of 6.0 SLM, and a N_2 flow rate of 3.15 SLM, (2) a total deposition pressure of about 2.4 Torr, and (3) a deposition temperature of between 100 and 650° C, particularly 400° C. In general, Ojha et al. is silent as to the specifics of the PECVD process, except to say that the PECVD process may involve the use of silane and nitrous oxide as sources for silicon and oxygen, respectively, for the deposition of the waveguide material (Col.3, lines 19 – 24). Therefore, one of ordinary skill in the art would have been motivated to seek-out and utilize PECVD process parameters that are effective in depositing a silica film from gases such as silane and nitrous oxide, as desired by Ojha et al.

Ngo et al. teaches that the PECVD process recipe claimed by the applicant (i.e., a silane flow rate of 0.2 SLM, an N_2O flow rate of 6.0 SLM, a N_2 flow rate of 3.15 SLM, a total deposition pressure of about 2.4 Torr, and a deposition temperature of between

100 and 650° C, particularly 400° C) is a well-known PECVD process recipe used to deposit silica films on a substrate (Col.4, lines 13 – 31, Claims 1 – 4). It would have been obvious to one of ordinary skill in the art to utilize the PECVD process parameters taught by Ngo et al. to deposit the silica film(s) of Ojha et al. because Ojha et al. generally desires to deposit a silica film by PECVD from silane and nitrous oxide reactants and Ngo et al. teaches a specific set of process parameters (e.g., gas flow rates, deposition pressure, deposition temperature, etc.) that are used to achieve just such a goal.

The combination of Ojha et al. and Ngo et al. does not explicitly teach that the annealing process minimizes the presence of Si-O-H-N compounds in the film. However, Ojha et al. teaches that the annealing process removes undesirable contaminants from the film in general (Col.1, lines 12 – 53 and 64 – 67, Col.2, lines 1 – 10 and 58 – 65, Col.3, lines 52 – 62, and Col.5, lines 20 – 36), and the combination of Ojha et al. and Ngo et al. teaches each and every process step and limitation of the applicant's claims, including the PECVD deposition temperature, the types of process gases, the deposition pressure, and the annealing temperature. As such, the annealing process of Ojha et al. would have inherently minimized the presence of Si-O-H-N compounds in the film, as claimed by the applicant. Please note that the mere observation of still another beneficial result (i.e., that annealing a PECVD silica film specifically reduces Si-O-H-N contaminants in the film, as opposed to contaminants in

general) of an old process cannot form the basis of patentability (*Allen et al. v Coe*, 57 USPQ 136).

7. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ojha et al. (USPN 5,904,491) in view of Ngo et al. (USPN 6,127,261), in further view of Chandross et al.

The combination of Ojha et al. and Ngo et al. teaches all the limitations of **Claim 22** as set forth above, except for a method wherein the pressure is maintained by a vacuum pump having a controllable pumping speed, and the total gas pressure is maintained by controlling the pumping speed.

Specifically, the combination of Ojha et al. and Ngo et al. is silent as to how the appropriate chamber pressure is maintained. Chandross et al. teaches that it was known in the art of silicon oxide deposition at the time of the applicant's invention to maintain the desired pressure in a vacuum chamber by controlling the pumping speed of a vacuum pump (Col.5, lines 48 – 60). Therefore, it would have been obvious to one of ordinary skill in the art to maintain the desired pressure in the vacuum chamber during the PECVD process by controlling the pumping speed of a vacuum pump, as taught by Chandross et al., with the reasonable expectation of successfully and advantageously maintaining the desired pressure (e.g., 2.4 Torr) by utilizing a well-known, conventional means of doing so.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WDM

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER